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ENDANGERED SPECIES

Technical Bulletin

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Endangered Species Program, Washington, D.C. 20240

Listing Protection Proposed for Eleven Plants and Animals

During July 1987, seven plant and four animal taxa were proposed for addition to the Federal lists of Endangered and Threatened wildlife and plants. If the listings become final, Endangered Species Act protection will be extended to the following:

photo by Kenneth D. Heil

The Chisos Mountain hedgehog cactus is a small, barrel-shaped variety with deep green to bluish-green stems up to 6 inches (15 centimeters) tall. Its attractive flowers have petals that are red at the base, white at mid-length, and fuschia at the tips.

Chisos Mountain Hedgehog Cactus (*Echinocereus reichenbachii* var. *chisoensis*)

Native to the southwestern United States, the Chisos Mountain hedgehog cactus is very restricted in numbers and distribution. Its entire population of approximately 1,000 plants is known from only a few places in southern Brewster County, Texas. Fortunately, these sites are protected as part of Big Bend National Park. The species' low numbers and localized occurrence nevertheless make it vulnerable to extinction from collecting or habitat disruption. To help increase its protection, the Service has proposed to list the Chisos Mountain hedgehog cactus as Threatened (F.R. 7/6/87).

This cactus grows amid sparse Chihuahuan Desert vegetation on alluvial flats near the Chisos Mountains, the local range from which the cactus takes its name. Between World War I and World War II, before the park was established, this area was heavily overgrazed by livestock. Removal of the native short grass cover may have altered the preferred habitat conditions for establishment of Chisos Mountain hedgehog cactus seedlings. The return of native grasses may create an environment more favorable to the cactus seedlings; however, recovery of overgrazed desert rangelands is a slow process and some desert plant communities never return to their former composition.

Because the Chisos Mountain hedgehog cactus is so rare and has such attractive flowers, some private and commercial collectors find it desirable. Although collecting any cacti in the park without a permit is prohibited, taking of the Chisos Mountain hedgehog cactus probably has occurred in recent years, and any illegal collecting is detrimental to such small populations. They also are potentially vulnerable to harm from road maintenance and trail building unless these activities take the species' presence into account. No Federal activities that might adversely affect the cactus are known or expected.

Two Southwestern Bats

Two other residents of the southwest also have been proposed for listing (F.R. 7/6/87), this time as Endangered: the **Mexican long-nosed bat (*Leptonycteris nivalis* and Sanborn's long-nosed bat (*L. sanborni*).** Both species occur as far south as Central America and reach the U.S. at the northern end of their ranges. They have declined dramatically in recent years, primarily the result of killing by humans and overexploitation of the bats' food plants.

Bats in the genus *Leptonycteris* are small, weighing at most one ounce (28 grams). They differ strikingly from most others in the U.S. in having an elongated muzzle with a small nose "leaf" at the tip. The long tongue, an adaption to feeding on flowers, measures up to 3 inches (76 millimeters), compared to a maximum head and body length of about 3.75 inches (90 mm). Both *L. nivalis* and *L. sanborni* are adapted for life in arid country, and are found mainly in desert scrub habitat in the northern parts of their ranges; farther south, however, they sometimes occur at high elevations on wooded mountains. For roosting during the day, these bats depend almost entirely on caves and abandoned mine tunnels. Populations in the U.S. and northern Mexico apparently migrate southward in the fall and return in the spring, with groups occupying the same roosting sites year after year.

The only known *L. nivalis* roosting site in the U.S. still in use is a shallow cave within Big Bend National Park in Texas. Even though the cave is protected, its *L. nivalis* population has plunged from an estimated 10,650 bats in 1967 to about 1,000 in 1983. A recent FWS-funded survey indicated that populations in Mexico also are

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Regional News

Endangered species program regional staff members have reported the following news for the month of July:

Region 1 — An interagency rescue effort was carried out during the first week of July to salvage Lahontan cutthroat trout (*Salmo clarki henshawi*) from sections of By-Day Creek (Mono County, California), which is drying up because of this year's low runoff. Over 200 fish were rescued and taken to a headwater stream (Horse Creek) in the East Walker River drainage. The salvaged fish will be held in that glacial-fed stream until they can be used for a planned reintroduction into Slinkard Creek later this year.

* * *

Dr. Jack Williams, of the Fish and Wildlife Service's Sacramento (California) Endangered Species Office, recently presented a draft protocol for conducting introductions of Endangered and Threatened fishes at the American Society of Ichthyologists and Herpetologists meeting in Albany, New York. A manuscript describing the protocol will be submitted to the American Fisheries Society for official adoption.

* * *

Four bald eagle (*Haliaeetus leucocephalus*) nestlings removed from nests along coastal British Columbia, Canada, were released at key hack sites in California by the Ventana Wilderness Sanctuary.

* * *

Three productive bald eagle nests were observed at Cascade Reservoir near Boise, Idaho. Idaho's 1987 total includes 26 productive nests and 31 active nests.

* * *

The 1987 southern sea otter (*Enhydra lutris nereis*) census was completed recently by the Service and the California Department of Fish and Game. The total of 1,650 included 220 pups and was up from last year's total of 1,570. Although this year's census appears promising, the indicated upward trend has not been statistically substantiated.

Editor's note: A final rule authorizing establishment and containment of an experimental population of southern sea otters in the vicinity of San Nicolas Island, off the coast of southern California, was published in the August 11, 1987, *Federal Register*. Future editions of the BULLETIN will contain more news on this recovery effort.

* * *

A recent 3-acre fire at California's Antioch Dunes National Wildlife Refuge could enhance Antioch Dunes evening-primrose (*Oenothera deltoides* ssp. *howellii*) propagation by opening overgrown habitat. Fortunately, the fire occurred in an area where there were not any Antioch Dunes evening-primroses, Contra Costa wallflowers

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Region 1: California, Hawaii, Idaho, Nevada, Oregon, Washington, and Pacific Trust Territories. **Region 2**: Arizona, New Mexico, Oklahoma, and Texas. **Region 3**: Illinois, Indiana, Iowa, Michigan, Minnesota, Missouri, Ohio, and Wisconsin. **Region 4**: Alabama, Arkansas, Florida, Georgia, Kentucky, Louisiana, Mississippi, North Carolina, South Carolina, Tennessee, Puerto Rico and the Virgin Islands. **Region 5**: Connecticut, Delaware, Maine, Maryland, Massachusetts, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island, Vermont, Virginia and West Virginia. **Region 6**: Colorado, Kansas, Montana, Nebraska, North Dakota, South Dakota, Utah, and Wyoming. **Region 7**: Alaska. **Region 8**: Research and Development nationwide.

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Regional News

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(*Erysimum capitatum* var. *angustatum*), or host plants of the Lange's metalmark butterfly (*Apodemia mormo langei*).

* * *

Results from the latest transect surveys at the Coachella Valley Preserve in southern California show a decline in numbers of the Threatened Coachella Valley fringe-toed lizard (*Uma inornata*) observed, but not nearly as great as that for the desert iguana (*Dipsosaurus dorsalis*) and the zebra-tailed lizard (*Callisaurus draconoides*). The reason for the apparent decline in the number of all lizards presumably has been the extremely dry conditions in the area this year.

* * *

Extremely high water temperatures are the apparent cause of a die-off of Endangered Borax Lake chubs (*Gila boraxobius*) in southeastern Oregon. High air temperatures, coupled with cloudless and windless conditions, intensified the naturally warm water conditions. Expected cooler air temperatures should lead to more moderate water temperatures in the lake.

Region 2 — Studies on the status of two New Mexico salamanders, the Sacramento Mountains salamander (*Aneides hardii*) and the Jemez Mountains salamander (*Plethodon neomexicanus*) are currently being conducted by the Service (Region 2), the U.S. Forest Service, and the New Mexico Department of Game and Fish. Both salamanders have been under study for several years to determine their range, abundance, ecological and biological needs, distribution in relation to ongoing timber management, and the effects of timber harvest on the salamanders. The current study will be completed in the fall of 1988.

These salamanders inhabit higher elevation, old-growth, mixed conifer woodlands. The Sacramento Mountains salamander is endemic to the Sacramento, Capitan, and Sierra Blanca Mountains of Lincoln and Otero Counties; the Jemez Mountains salamander is endemic to the Jemez Mountains of Sandoval and Los Alamos Counties. Study results will be used to determine the needs for Federal protection and to determine methods for minimizing the impacts of timber harvests on the salamanders' habitat.

* * *

A new Ozark big-eared bat (*Plecotus townsendii ingens*) maternity colony was discovered in Adair County, Oklahoma, in June. Based on emergence counts, biologists estimated that about 260 of the bats are using the cave. The newly discovered colony is one of the largest known maternity colonies of this Endangered subspecies.

* * *

Through a Section 6 agreement with the Service, Paul Knight and Anne Cully of the New Mexico Energy, Minerals and Natural Resources Department have been working on several Threatened and Endangered plants. Monitoring plots have been established at populations of Kuenzler's cactus (*Echinocereus fendleri* var. *kuenzleri*), Knowlton's cactus (*Pediocactus knowltonii*), Mesa Verde cactus (*Sclerocactus mesae-verdae*), McKittrick pennyroyal (*Hedeoma apiculatum*), Zuni fleabane (*Erigeron rhizomatus*), Mancos milk-vetch (*Astragalus humillimus*), and gypsum wild buckwheat (*Eriogonum gypsophilum*). Data being collected on these plants include information on pollination,

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Protection Approved for Gopher Tortoise and Audubon's Crested Caracara

The gopher tortoise (*Gopherus polyphemus*), a large terrestrial turtle that digs extensive burrow systems, occurs along the coastal plain from South Carolina through Florida to southeastern Louisiana. Widespread reductions of its well-drained pine woodland habitat due to urban and agricultural uses have eliminated the tortoise from more than 80 percent of its western range. Certain timber management practices (fire suppression and clear cutting) threaten much of the remaining habitat, and collecting of tortoises for food and the pet trade is another danger. Among the other animals affected by the gopher tortoises's decline are up to 29 vertebrates that use the burrows for refuge from predators and as a cool, moist microenvironment. On July 8, 1986, the Fish and Wildlife Service proposed to list the gopher tortoise's western population (extending from the Tombigbee and Mobile Rivers in Alabama to southeastern Louisiana) as Threatened (see summary in BULLETIN Vol. XI No. 8-9). The final listing rule was published in the July 7, 1987, *Federal Register*.

Audubon's crested caracara (*Polyborus plancus audubonii*) is a hawk about the size of an osprey that occurs primarily from Panama through Central America and Mexico to Cuba and the southwestern United States. There also is an isolated population in peninsular Florida. Once common on the State's central prairie region, the Florida caracara population has declined to an estimated maximum of 500 birds, less than one-third the number existing in 1900. Again, habitat alteration is the main problem. The crested caracara in Florida is a bird of the open prairie country and nearby wetter areas with scattered cabbage palms for nesting. Large areas of this habitat type have been lost to citrus groves, other agricultural uses, and real estate development. In an effort to prevent the bird's extinction, the Service proposed June 23, 1986, to list the Florida population of Audubon's crested caracara as Threatened (see feature in BULLETIN Vol. XI No. 7). The final rule was published July 6, 1987.

* * *

Both of these listed animals now receive protection under the Endangered Species Act, the terms of which are summarized in this edition of the BULLETIN at the end of the story about species newly proposed for listing.

Requirements for Turtle Excluder Devices are Approved

The National Marine Fisheries Service of the U.S. Department of Commerce has published final regulations to require the use of turtle excluder devices (commonly referred to as TEDs) by shrimp trawlers in the Gulf of Mexico and in the Atlantic Ocean off the southeastern United States (F.R. 6/29/87). These rules were designed to reduce the incidental capture and drowning of Threatened and Endangered sea turtles in shrimp trawls while minimizing regulatory effects on shrimpers.

Specific information on the various zones, seasons, TED specifications, and restrictions on tow times is contained in the June 29, 1987, *Federal Register*, pp. 24244-24262. The September BULLETIN will summarize modifications in the final rules from the version originally proposed on March 2, 1987 (see earlier feature in BULLETIN Vol. XII No. 4).

Perdido Key Beach Mouse Relocation

Mike Dawson
Jackson (Alabama) Field Office

An additional Perdido Key beach mouse (*Peromyscus polionotus trissyllepsis*) population has been established on Gulf Islands National Seashore in Florida. Listed as Endangered in June 1985, the Perdido Key beach mouse was originally found on much of Perdido Key, which extends along the Gulf Coast of Baldwin County, Alabama, and Escambia County, Florida. Designated Critical Habitat for the species now consists of 1.8 miles (2.9 kilometers) of occupied habitat (Gulf State Park, Alabama) and 9 miles (14.5 km) of currently unoccupied habitat (Perdido Key State Preserve and Gulf Islands National Seashore, both in Florida).

In July 1979, researchers estimated that there was a population of 26 Perdido Key beach mice at Gulf State Park (Florida Point, Alabama) and an estimated population in Florida of 52 individuals on Gulf Islands National Seashore at the eastern end of Perdido Key. However, Hurricane Frederick, which hit the coast in September 1979, apparently destroyed the entire eastern population of the subspecies, and the Florida Point population to the west was so low that only one individual was trapped there during a 1981 survey. By April 1986, the population apparently had increased slightly but still consisted of no more that 31 individuals.

Because of the precarious status of the Perdido Key beach mouse, a top recovery priority was to establish an additional population. A release site was selected on Gulf Islands National Seashore, Florida, approximately 0.9 mile (1.5 km) from the eastern end of Perdido Key. This site was chosen because of well developed dunes, a productive stand of seed oats (*Uniola paniculata*), and limited human disturbance. Trapping surveys over the preceding 3 years had verified the absence of beach mice in the area.

To provide initial protection from predators and to hold the released mice in one location for an adequate time to permit burrow establishment, a large enclosure was constructed in the primary dunes. The enclosure had a circumference of approximately 164 feet (50 meters). Its walls were made of sheet aluminum, 4 feet (1.2 m) wide, which was buried about 18 inches (46 centimeters) in the sand and arranged to encircle most of a dune. Chicken wire (1-inch mesh) was attached to the upper edge of the aluminum, resulting in a wall extending about 6 feet (1.8 m) above the ground. Posts were placed along the ridge of the dune, and the entire enclosure was covered with plastic bird mesh to exclude potential avian predators.

photo by Mike Dawson

This enclosure was built to protect the reintroduced Perdido Key beach mice until they established burrows.

A November 1986 survey of the existing Perdido Key beach mouse population at Gulf State Park (Florida Point) indicated that its numbers had increased slightly from the April 1986 estimate. On November 15, three pairs of beach mice were trapped at Florida Point for relocation to Gulf Islands National Seashore. These mice were transported to the enclosure and released on November 16, 1986.

The mice explored the enclosure briefly, then entered existing ghost crab burrows or constructed burrows of their own. Supplemental food (sunflower seeds) and water were provided. On November 17, a check of the enclosure revealed evidence that some mice had escaped. Frequent checks over the next few weeks continued to note mouse tracks inside and outside of the enclosure. On January 13, 1987, one additional pair of beach mice was captured at Florida Point and moved to the enclosure. Several openings were made in the enclosure in February so that mice could freely move in and out. On April 11, three additional pairs of beach mice from Florida Point were relocated to the enclosure. Openings in the enclosure were closed temporarily until their burrows were established. Supplemental food has been provided throughout the relocation effort.

Recent surveys have indicated that the relocated mice have dispersed to surrounding dunes and established new burrows. There are plans to conduct live-trapping at these areas in November 1987 to determine if the new beach mouse population is reproducing.

Proposal to List Thornber's Fishhook Cactus is Withdrawn

Thornber's fishhook cactus (*Mammillaria thornberi*), a small, cylindrical succulent with hooked spines, is known from the Sonoran Desert in Pima and Pinal Counties, Arizona. It was proposed in 1984 for listing as a Threatened species on the basis of data that the cactus was imperiled by low numbers, a limited distribution, and a variety of threats to the habitat. (See story in BULLETIN Vol. IX No. 5).

Subsequent to the proposal, the Fish and Wildlife Service received new information indicating that listing *M. thornberi* currently is not warranted under the terms of the Endangered Species Act. Estimates of the species' numbers have been revised upward and threats to the habitat have been judged less severe than originally thought. Accordingly, the Service published a notice in the July 27, 1987, *Federal Register* withdrawing the listing proposal.

Thornber's fishhook cactus and its habitat will nonetheless receive management protection on four sites: Saguaro National Monument, Organ Pipe Cactus National Monument, Tucson Mountains County Park, and a tract of land in Avra Valley set aside by the Bureau of Reclamation as mitigation for construction of a Central Arizona Project aqueduct. In addition, the collection of all cacti, including *M. thornberi*, from the wild without a permit is prohibited by Arizona State law.

Proposed Species

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severely declining. The other species, *L. sanborni*, once occurred from central Arizona and southwestern New Mexico through much of Mexico to El Salvador. In recent decades, this species has disappeared from most of its former roost sites in the U.S., including southern Arizona's Colossal Cave, which contained as many as 20,000 of the bats until the 1950's. A survey of historical roosting sites in Mexico located the species in only three places, and found very few bats in two of those. To the south of Mexico, *L. sanborni* is known only by a single specimen collected in El Salvador in 1972.

Although the reasons for the decline of the long-nosed bats are not entirely clear, habitat disruption is suspected as the major cause. The two most important habitat components for these bats are roosting sites and food sources. There are only a limited number of caves and mines that provide the proper environment for roosting, and most of these sites are increasingly subject to destruction and disturbance. Vandals have been known to kill large numbers of these bats for fun. Also, in some parts of Mexico, all bats are considered possible vampire bats, and control operations often destroy all species of bats in a cave.

The other main limiting factor for the bats is the dependability of their food supply. Instead of insects, *Leptonycteris* depends on the night-blooming flowers of certain paniculate agaves (century plants) and columnar cacti. The bats feed on the highly caloric nectar and protein-rich pollen of these plants to fuel their high metabolism. Both bat species have adapted long muzzles and tongues for reaching deep into the flowers.

photo by Merlin D. Tuttle, Bat Conservation International

Mexican long-nosed bat

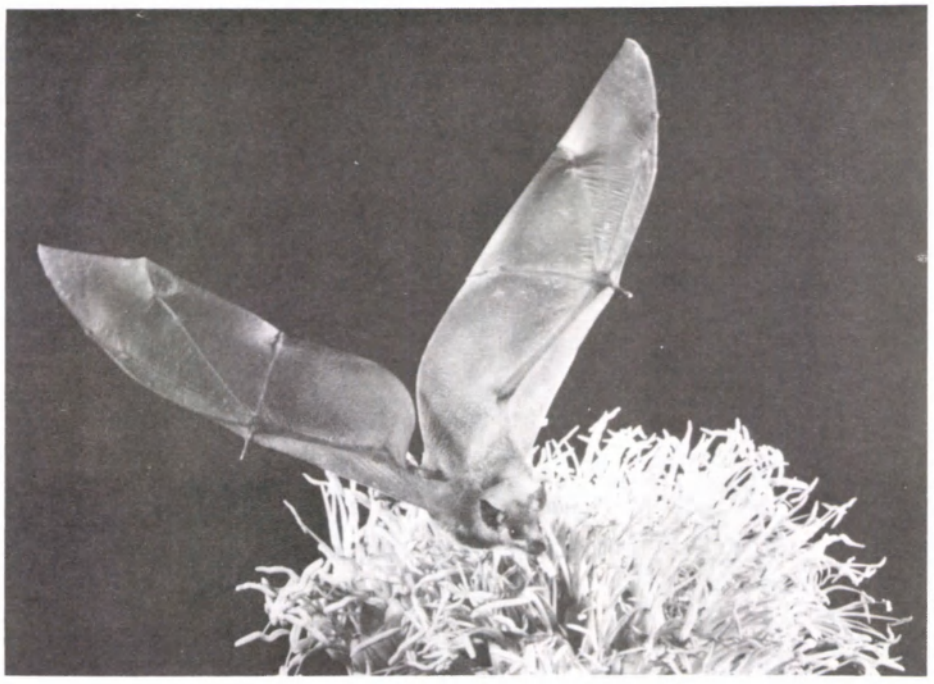

photo by Merlin D. Tuttle, Bat Conservation International

This Sanborn's long-nosed bat is pollinating on* Agave palmeri *flower as it feeds on the plant's pollen and nectar.

There is an apparent close interdependence between these bats and their food plants. Annual bat migrations seem to be associated with the times that certain agaves and cacti are flowering in certain areas. The plants benefit, too; long-nosed bats are thought to be the most important pollinator of the giant saguaro (*Cereus giganteus*) and organ pipe (*C. thurberi*) cacti, as well as some agaves, in the northern part of the bats' ranges. As they migrate southward into northern Mexico, the only food plants available to the bats are agaves. These same agaves, however, are being intensively harvested by "moonshiners" for small-scale production of tequila and other alcoholic beverages made from the plants. Excess harvest and other factors resulting in elimination of agaves may have contributed substantially to the drastic decline in long-nosed bat populations. In turn, the drop in bat numbers has coincided with a decline in the reproductive success of some agave species, possibly because of inadequate pollination. Other agaves, along with the saguaro and organ pipe cacti, also may be affected. This apparent linkage could lead to a downward spiral with further declines in both the bats and their food plants, with serious implications for the entire southwest desert ecosystem.

Kearney's Blue-Star (*Amsonia kearneyana*)

Only eight individuals of Kearney's blue-star, a herbaceous perennial plant in the dogbane family (Apocynaceae), are known to exist. All eight are restricted to a single canyon in the Baboquivari Mountains of southern Arizona, a site that is within the Tohono O'odham (formerly Papago) Indian Reservation. The current *A. kearneyana* population, which is down from the 25 plants found in 1982, is threatened with extinction from the effects of overgrazing and (possibly) insect predation. Accordingly, the Service has proposed listing this species as Endangered (F.R. 7/10/87).

A single Kearney's blue-star has up to 50 erect or ascending stems that give the plant a hemispherical shape. Lance-shaped leaves with soft hairs are arranged alternately on the stems, which can reach as high as 32 inches (81 cm). The plant's white flowers are borne in clusters at the ends of branches.

Kearney's blue-star grows in the riparian vegetation zone along a dry, rocky wash. This habitat has been severely modified by cattle grazing. Although cattle apparently do not eat this plant, they contribute to increased erosion by disturbing the topsoil, and they may trample *A. kearneyana* seedlings. Overgrazing of other vegetation also can lead to a decline in floral diversity, which in turn may be accompanied by a reduction in pollinator numbers and species. Poor pollination success could explain, at least in part, the fact that the Kearney's blue-star population is showing very little reproduction. Another explanation may be seed predation by stinkbugs (*Chlorochroa ligata*), which are known to damage the seeds of a related plant.

Sacramento Prickly Poppy (*Argemone pleiacantha* ssp. *pinnatisecta*)

A robust perennial in the poppy family (Papaveraceae), this plant has attractive white and yellow flowers, long, relatively

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Proposed Species

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narrow leaves, and up to 12 prickly stems that can grow as high as 60 inches (15 decimeters). It is known only from several canyons in the Sacramento Mountains of south-central New Mexico. A 1982 survey located three colonies containing fewer than 170 individuals. Because of evidence that these small populations are declining, the Service has proposed to list *A. p.* ssp. *pinnatisecta* as Endangered (F.R. 7/13/87).

Within its limited range, the Sacramento prickly poppy requires relatively moist soils found on north-facing slopes, in canyon bottoms, along roadsides, and near leaks in water pipelines. About half of the plants are on New Mexico State or Otero County highway rights-of-way. The rest occur on pnvate property, a State park, and Lincoln National Forest.

Colonies of the species that occur along roadsides are vulnerable to road widening and maintenance, roadside mowing, and herbicide applications.

The U.S. Forest Service manages Lincoln National Forest, on which several populations of the prickly poppy occur. As a matter of policy, the Forest Service already gives consideration to such Federal listing candidates in its environmental assessments and other planning. If this plant is listed, the existing protection will be strengthened; the Forest Service will, under Section 7 of the Endangered Species Act, ensure that none of its activities (e.g., construction and maintenance of roads and trails, designation of water rights and grazing allotments) will jeopardize the species. The Federal Highway Administration also will protect the species when it funds any State or county road work by ensuring that such roadwork will not jeopardize the prickly poppy. No major impacts on Federal activities are expected.

photo by Peggy Olwell

The Sacramento prickly poppy has attractive white and yellow flowers.

Cattle grazing can have both direct and indirect effects on the Sacramento prickly poppy. When cattle stocking rates are high, some plants of this species are eaten while others are trampled. Overgrazing not only reduces plant cover, it also disturbs topsoil and increases erosion. This degradation in the local watershed can increase the probability and severity of flash floods. The Sacramento prickly poppy is particularly vulnerable to flooding because many of the plants occur in drainages. For example, one population of the plant was nearly eliminated during a flash flood in 1978.

The diversion of permanent spring water from drainages in the Sacramento Mountains to pipelines for human and livestock use creates artificially dry conditions in some places where the moisture-dependent prickly poppy occurs. Installation of a pipeline in one canyon, with subsequent drying of the habitat, probably caused the greatest decline in the plant's numbers.

Mathis Spiderling (*Boerhavia mathisiana*)

The Mathis spiderling is a small perennial herb with small, bright pink flowers. This member of the "four o'clock" family (Nyctaginaceae) is known to grow only on outcrops of caliche (calcium carbonate) in the south Texas plains. Although caliche outcrops occur at various places within the region, *B. mathisiana* has been found at only two sites.

Fewer than 250 individuals of the species are known to exist. Most are in the San Patricio County population, which apparently was fragmented by caliche mining into four colonies. Because the demand for caliche gravel is expected to increase, further habitat loss is probable. The Live Oak County population, which consists of fewer than 10 plants, is thought to be a remnant of a once larger population that was greatly reduced by residential development. Further residential and commercial development of this area, which is near a recreational lake, could eliminate additional plants. Both populations are on private lands, and the Service plans to seek landowner cooperation for conserving of the remaining plants.

Pitcher's Thistle (*Cirsium pitcheri*)

C. pitcheri is a member of the composite or sunflower family (Asteraceae). It grows on sand beaches and open dune complexes along the Great Lakes shorelines of Michigan, Indiana, Wisconsin, and Ontario, Canada. Although the species also was reported historically from the shore of Lake Michigan in Illinois, it apparently has been extirpated from that State. Because of the vulnerability of its habitat, *C. pitcheri* has been proposed for listing as a Threatened species (F.R. 7/20/87).

Pitcher's thistle apparently has a limited ability to disperse seed, along with other characteristics that restrict it to narrowly defined microhabitats along open lakeshores. This plant seems able to tolerate infrequent disturbances of its habitat (once every 5 to 10 years), and it can recolonize disturbed areas if a large enough colony remains. However, Pitcher's thistle cannot withstand *frequent* (monthly to annual) habitat disturbance.

Shoreline development is reducing *C. pitcheri* habitat. In addition to the loss from construction activities, some dunes have been bulldozed to provide better lake views for cottage residents. Dune areas also are favorite places for the use of off-

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Pitcher's thistle bears dense, white-wooly, deeply divided leaves with long petioles and cream-colored or yellowish flowers.

road vehicles, which probably cause as much damage to the species as anything. Some landowners also have attempted to eradicate the plant directly in the belief that it is an undesirable weed. Most of the remaining Pitcher's thistle colonies are on public lands. The species is found on the Indiana Dunes National Lakeshore (Indiana), the Nordhouse Dunes area of the Huron-Manistee National Forest (Michigan), the Sleeping Bear Dunes and Pictured Rocks National Lakeshores (Michigan), a small stretch of Wisconsin shoreline on Lake Michigan managed by the U.S. Coast Guard, and several State parks. Although maintaining quality shoreline habitat is an objective of the agencies that manage these lands, *C. pitcheri* colonies could be damaged if subjected to heavy, frequent recreational use.

Habitat management practices employed by the National Park Service are intended to improve the condition of Pitcher's thistle colonies on National Lakeshores. No known Federal activities are expected to interfere with conservation of the species on Federal or other lands.

Daphnopsis hellerana

This plant has no known common name, perhaps because it is so rare. Historical records refer to four populations of the species on the island of Puerto Rico, but only two remain and they contained only seven individuals each at last count. Because of the species' low numbers and continued vulnerability from habitat loss, the Service has proposed to list *D. hellerana* as Endangered (F.R. 7/6/87).

D. hellerana, a member of the mezereum family (Thymelaeaceae), is an evergreen shrub or small tree that can reach up to 20 feet (6 meters) in height. It is a dioecious species, meaning that the male and female flowers are borne on separate plants. *D. hellerana* is endemic to subtropical moist forests in the limestone hill region of northern Puerto Rico.

Nearly all of the historical and surviving populations of this plant have been located near Puerto Rico's main human population center, the San Juan/Bayamon area. Urban and industrial development, quarrying of limestone for use in construction, landfills, and the clearing of forests by yam planters all have contributed to the decline of *D. hellerana*. One of the two remaining populations is in the Dorado area on Commonwealth of Puerto Rico (Land Authority) property; however, this land is not in protective status and is subject to quarrying and the construction of roads and power lines. The other *D. hellerana* population is at Toa Baja on Federal land that is under the jurisdiction of the National Institutes of Health but leased to the University of Puerto Rico's School of Medicine. There are no known current activities on this property that are expected to jeopardize the species' survival. Nevertheless, the populations at Toa Baja and Dorado are extremely small, and observations suggest that there currently is not enough successful reproduction to sustain either population.

Cumberland Sandwort (*Arenaria cumberlandensis*)

Although a member of the "pink" family (Caryophyllaceae), the Cumberland sandwort is a perennial with white flowers. This herbaceous plant reaches 6 inches (15 cm) in height and has relatively long, narrow leaves. *A. cumberlandensis* is named for the general region in which it grows, a limited portion of the Cumberland Plateau in north-central Tennessee and adjacent Kentucky. Only five populations are known, and their vulnerability has led the Service to propose *A. cumberlandensis* for listing as an Endangered species (F.R. 7/6/87).

Most *Arenaria* species in the southeastern U.S. grow in hot, dry, sunny environments; *A. cumberlandensis*, however, needs a very different habitat. This plant is restricted to the floors of rockhouses (shallow, cave-like openings in cliff faces), overhung ledges, and solution pockets in sandstone rock faces. These structures can provide the critical combination of shade, moisture, cool temperatures, and high humidity needed by *A. cumberlandensis*.

Of the species' five known populations, four occur in Tennessee. The largest population is in the Pickett State Park and Forest (Pickett County), where the habitat faces impacts from recreational activities (e.g., camping, hiking) and, potentially, from logging. A very small population of fewer than six clumps is located on the watershed of a municipal water supply reservoir in Fentress County. On public and private lands along the border of Fentress and Morgan Counties, another small population of *A. cumberlandensis* is vulnerable to trampling by hikers and habitat damage resulting from logging. A population of about 50 clumps is known from Scott County on the Big South Fork National River and Recreation Area, which is managed by the National Park Service. The Cumberland sandwort site has been severely damaged through trampling by recreational visitors, collectors of Indian artifacts (who dig within the rockhouses), and trash dumping. Fortunately, the Park Service is now aware of the rare plant's presence, strongly supports listing, and will implement measures to conserve the species' habitat.

Kentucky's lone *A. cumberlandis* population is in McCreary County on Daniel Boone National Forest. It is subject to the same threats facing the Tennessee populations, although the U.S. Forest Service has expressed interest in protective measures and plans no logging operations near the site.

Shasta Crayfish (*Pacifastacus fortis*)

Under the common name "placid crayfish" (so called because of its behavior), *P. fortis* originally was proposed in 1977 for listing as a Threatened species. The proposal was later withdrawn for procedural reasons. Since a 1978 survey, the numbers of this vulnerable crustacean have dropped by about 50 percent in the face of habitat degradation and competition from introduced crayfish species. Now commonly referred to as the Shasta crayfish, named after the northern California county where it is found, *P. fortis* has been reproposed for listing, this time as Endangered (F.R. 7/10/87).

Shasta crayfish are native to a small portion of the Pit River drainage system, including tributaries of the Fall River and

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photo by Robert R. Currie

cumberland sandwort

Proposed Species

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Hat Creek subdrainages. They inhabit cool, clear, spring-fed lakes, rivers, and streams, usually at or near a spring inflow source where waters remain at a constantly cool temperature year-round. Unlike some other crayfish species, *P. fortis* seems most abundant where aquatic plants are absent. Another important habitat requirement appears to be the presence of enough volcanic rubble substrate to provide cover for escape from predators.

Because of its specialized habitat needs, the Shasta crayfish is particularly vulnerable to changes in its aquatic environment. Siltation of the rubble substrates, increases in water temperatures and turbidity, and other forms of water pollution not only make the habitat less hospitable to *P. fortis* but actually favor the spread of introduced crayfish. These exotic species, which are more adaptive and have higher reproductive rates, are expanding into the range of the Shasta crayfish at an alarming rate, competing with it for food and living space. Two exotics have displaced native crayfish species in other regions and are doing the same to *P. fortis*.

Activities that have led to alteration of the aquatic habitat include projects such as stream impoundments, diversions, and channelization. Other impacts are related to agriculture: the increasing demand for water has lowered the water table in some areas and reduced springflows; pesticides washed into the waterways harm aquatic invertebrates; and nutrient-rich run-off is increasing the growth of aquatic plants, rendering the habitat unsuitable for the Shasta crayfish. Water turbidity is increasing due to livestock grazing and certain forms of recreation near watercourses.

Most of the land within the Shasta crayfish range is privately owned. The U.S. Forest Service and Bureau of Land Management administer less than 10 acres each, but these areas are being managed in ways consistent with conservation of the species. If *P. fortis* is listed by the Fish and Wildlife Service, the U.S. Army Corps of Engineers and Federal Energy Regulatory Commission will probably need to consult with the Service on their involvement with future water developments, but no significant conflicts are anticipated. The Service will investigate means of eliminating the exotic crayfish species and seek to work with landowners on ways to control potentially toxic runoff. A Federal listing would complement the protection already available for the species under California's own endangered species legislation.

photo by Daniel F. Williams

Tipton kangaroo rat

Tipton Kangaroo Rat (*Dipodomys nitratoides nitratoides*)

Kangaroo rats (*Dipodomys*) are small mammals that, like Australian kangaroos, can travel rapidly by hopping about on their elongated hind legs, using their long, tufted tails as rudders. They mainly inhabit dry, open country in western North America where they construct burrows for shelter and, often, for storing food.

Three *Dipodomys* taxa are listed by the Fish and Wildlife Service as Endangered, and a number of others are candidates for future listing. One of these candidates is the Tipton kangaroo rat (*D. n. nitratoides*), which the Service recently proposed for listing as Endangered (F.R. 7/10/87). This subspecies has been eliminated from over 96 percent of its former range, due mostly to conversion of its native scrub and grassland habitat to agricultural uses.

The Tipton kangaroo rat is restricted to the Tulare Lake Basin of the San Joaquin Valley in south-central California. Within this region, it inhabits the soft, friable soils of the basin floor that escape seasonal flooding. An integral member of its ecosystem, the Tipton kangaroo rat influences floral distribution by dispersing native plant seeds, transporting them in external cheek pouches to underground food caches. The small rodents also serve as prey for a variety of carnivores, including the Endangered San Joaquin kit fox (*Vulpes macrotis mutica*). Kangaroo rat burrows aerate the basin soils, another benefit to the vegetation, and the burrows are used for refuge by a number of other species, one of which is the Endangered blunt-nosed leopard lizard (*Gambelia silus*). Extinction of the Tipton kangaroo rat therefore would have impacts beyond its own loss.

The decline of the Tipton kangaroo rat

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photo by Ted Rado

Typical habitat of the Tipton kangaroo rat on the Paine Wildflower Memorial Preserve, owned by The Nature Conservancy.

indicates how much native habitat in the Tulare Lake Basin has been altered. Historically, the subspecies occurred over approximately 1,700,000 acres (695,000 hectares) in parts of Fresno, Kings, Tulare, and Kern Counties. By 1985, however, its range had fallen to 63,400 acres (25,700 ha), less than 4 percent of the original amount. Conversion of habitat for agricultural production accounts for most of the past decline and continues to threaten much of the remaining range.

Much of the remaining habitat consists of small fragments surrounded by agricultural lands on private property. However, approximately 6,400 acres (2,600 ha) are administered by local, State, and Federal agencies. These public lands currently contain low- to moderate-density populations of the Tipton kangaroo rat and are thought to be relatively secure from modification. Many of the extant occupied habitats, however, may be too small to ensure the long-term survival of their individual Tipton kangaroo rat populations.

Possible Federal actions that may affect the Tipton kangaroo rat are issuance of agricultural leases on Bureau of Land Management holdings; construction by the Soil Conservation Service of evaporation ponds for agriculturaf runoff; issuance of permits by the Environmental Protection Agency for development of oil and natural gas reserves; and Bureau of Reclamation water projects that would assist in converting native habitat to agricultural lands. Such actions also would be likely to affect the Endangered blunt-nosed leopard lizard and San Joaquin kit fox, whose habitat is already protected under the Endangered Species Act. No major conflicts between Federal activities and conservation of these vulnerable animals are expected.

* * *

Available Conservation Measures

Among the conservation benefits provided by a listing as Threatened or Endangered under the Endangered Species Act are: protection from adverse effects of Federal activities; prohibitions against certain practices; the requirement for the Service to develop and implement recovery plans; the possibility of Federal aid to State and Commonwealth conservation departments that have signed Endangered Species Cooperative Agreements with the Service; and the authorization to seek land purchases or exchanges for important habitat. Listing also lends greater recognition to a species' precarious status, which encourages further conservation efforts by State and local agencies, various organizations, and individuals.

Section 7 of the Act directs Federal agencies to use their authorities to further the purposes of the Act by carrying out conservation programs for listed species. It also requires these agencies to ensure that any actions they authorize, fund, or carry out are not likely to jeopardize the survival of a listed species. If any agency finds that one of its activities may affect a listed species, it is required to consult with the Service on ways to avoid jeopardy or adverse modification of Critical Habitat. For species that are *proposed* for listing and for which jeopardy or adverse modification is found, Federal agencies are required to "confer" with the Service, although the results of such conferences are non-binding. Potential conflicts almost always are avoided by planning early, consulting informally during initial planning phases, and using the Section 7 process.

Further protection is authorized by Section 9 of the Act, which makes it illegal to take, possess, transport, or engage in interstate or international trafficking in listed animals, except by permit for certain conservation purposes. For listed plants, the rule is different; the trafficking restrictions apply, but collecting of listed plants without a permit is prohibited by the Act only on lands under Federal jurisdiction. Some States, however, have their own laws protecting listed plants and animals that may be more restrictive.

Land Donation Will Help Protect Endangered Bats

Twin Cities, Minnesota, Regional Office

A 90-acre tract of land in southeast Missouri was donated recently by the Pilot Knob Ore Company of St. Louis to the Fish and Wildlife Service as a refuge for an Endangered species, the Indiana bat (*Myotis sodalis*). The tract includes an abandoned ore mine with multiple entrances, the result of iron ore mining around the turn of the century. Upon donation, the property became part of the National Wildlife Refuge System.

Approximately 140,000 Indiana bats, an estimated one-fourth of the species' entire population, spend each winter in the mine system. These bats require hibernacula with an extremely narrow temperature range, ideally 40-47 degrees Fahrenheit with a maximum of 50 degrees Fahrenheit. After hibernation, the bats leave in the last part of April, returning in September. Little is known of the species' whereabouts during the summer months, but it is believed that Indiana bats from Pilot Knob Mine disperse throughout much of Iowa, Illinois, and northern Missouri. Thanks to the donation by Pilot Knob Ore Company, this Indiana bat colony has a better chance to survive.

The donation of the tract on Pilot Knob Mountain has opened the way for the Service to construct barriers and signs at the mine entrances to prevent people from entering the caves, thereby offering a substantial degree of protection for the bats. Disturbances from human intrusions arouse the bats from hibernation, thereby burning energy that they need to survive the winter. Such disturbances are believed to be a major cause of the species' Endangered status. The barriers and signs also will reduce the chances of accidental injuries to explorers.

Pilot Knob Mine, along with two other cave sites in Missouri, two in Indiana, and two in Kentucky, house three-quarters of the world's population of hibernating Indiana bats. By the end of this year, it is expected that all seven of these hibernation sites will have bat-protection barriers at their entrances.

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flowering, fruiting, recruitment of young, growth, mortality, threats, and loss of plants. Soil samples were taken from several monitoring plots to determine pH, texture, organic content, and radioactivity. The long term benefits from this monitoring will provide a better understanding of the biology of these plants, as well as an indication of the populations' stability. These data can then be used to make decisions on management and recovery of the species.

In addition to the monitoring efforts, new populations of the McKittrick pennyroyal, Mancos milk-vetch, and Kuenzler's cactus were discovered this year.

After a 7-week absence, the thick-billed parrots (*Rhynchopsitta pachyrhyncha*) that were released last fall in the Chiricahua Mountains of southern Arizona have returned. The birds disappeared in early June, but as of July 31, one flock of unknown size was reported from Tonto Creek in central Arizona and another was back in the Chiricahuas.

The masked bobwhite (*Colinus virginianus ridgwayi*) releases on Buenos Aires National Wildlife Refuge in southern Arizona are being hampered by a lack of rainfall. Dry conditions on the refuge are not favorable to the survival of the chicks, which are being held there in cages prior to release. The chicks, which were produced by the captive flock at the Patuxent Wildlife

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Research Center in Maryland, are being held longer than usual in anticipation of summer rains.

Seven adult bobwhites carrying radio transmitters are being tracked at the refuge. Most adults are paired, but nesting will likely be delayed until there are better weather conditions. The single masked bobwhite nest found on the refuge in early June contained 11 eggs. At least seven chicks hatched, but they probably did not survive.

Region 4 — An agreement to protect the first bald eagle nest to produce young in Tennessee since breeding eagles disappeared from that State has been reached between the private landowner, the Tennessee Wildlife Resources Agency, and the Service. Averett Lumber Company of Clarksville will protect the nest and its surrounding area, and will postpone construction of several goose hunting pits. The proposed hunting pits were to be constructed just outside the primary protection zone around the nest, and it is not clear at this time whether or not they would have a significant impact on the nesting eagles. The agreement to delay pit construction will permit the Service to study the eagle pair using the site. The study, already underway, will continue for about one and a half years.

* * *

A Center for Sea Turtle Research has been established at the University of Florida by the Florida State Legislature and University Board of Regents. The goal of the center is to conduct research on all aspects of sea turtle biology and to further sea turtle conservation through research and international education. Established in recognition of the outstanding achievements and pioneering research of Dr. Archie Carr, the center enhances the University of Florida's international preeminence in sea turtle studies. Dr. Carr, the first director of the center, died in May of this year. Dr. Karen Bjorndal recently was named associate director. Dr. Bjorndal also is Chairman of the Marine Turtle Specialist Group, part of the Species Survival Commission of the International Union for Conservation of Nature and Natural Resources.

* * *

Georgia's Fort Benning, which has the second highest number of red-cockaded woodpeckers (*Picoides borealis*) in the State, is proposing to construct a parachute drop zone. If the project goes as currently planned, it will be necessary to clear all vegetation within the zone. An active woodpecker colony (with one bird) currently existing in the proposed area would be destroyed. The Service recently entered into formal Section 7 consultation with the Army, and the Army has made a preliminary offer to attempt to relocate the impacted bird.

The Asheville (North Carolina) Field Office has been assisting the National Park Service in evaluating use by bats of several historical buildings and two abandoned mine systems within Great Smoky Mountains National Park. A small population of eastern big-eared bats (*Plecotus rafinesquii*) was found in one building. This species appears to be declining throughout its range and may be proposed for addition to the Federal Endangered and Threatened species list within the next few years. The Service has recommended that the park provide alternate roost sites for all bats that would be displaced by building repair in the park.

The largest known hibernating populations of *P. rafinesquii* exist in two abandoned sets of copper mines; a small maternity colony (80 adults) was found in one of them, and a smaller, apparently nonproductive, colony was found in the other. The Service is providing approximately $6,000 to the park to protect these colonies. Chain-link fences will be installed around five of the mine entrances, and a steel gate will be installed at another. The remaining entrances, which provide access to mines of no value as bat hibernation or maternity sites, will be blasted shut by the Park Service.

* * *

A representative of the Asheville Office has met with the city administrator for North Augusta, South Carolina, to discuss the Service's proposal to list the relict trillium (*Trillium reliquum*) as an Endangered species. The largest population of the species exists in and around the northern portion of the city, and the administrator had expressed concern that listing the plant might interfere with the city's planned improvement of sewer facilities. The Service plans to work closely with the city during design and construction of the sewer lines to ensure the plant's protection. Another smaller population of relict trillium also is located on city-owned land. The city has no plans to sell or extensively develop this site and will probably register it as a Natural Area if the plant is listed. A public hearing to list the relict trillium as an Endangered species was held in North Augusta in mid-June, and no significant problems were raised.

The Service has received a status survey report on seven mammals of Florida's east coast. Biologists from the University of Florida's Cooperative Fish and Wildlife Research Unit reached the following conclusions: the beach cottontail rabbit (*Sylvilagus floridanus ammophilus*), the seashore cotton rat (*Sigmodon hispidus littoralis*), and the Anastasia Island mole (*Scalopus aquaticus anastasae*) are all secure; Goff's pocket gopher (*Geomys pinetis goffi*) and the Anastasia Island cotton mouse (*Peromyscus gossypinus anastasae*) are presumed extinct; and the southeastern beach mouse (*Peromyscus polionotus niveiventris*) and Anastasia Island beach mouse (*Peromyscus polionotus phasma*) have lost large amounts of habitat and continue to face severe threats. The Service is considering whether or not to propose listing the latter two taxa as Endangered or Threatened.

* * *

Members of the Jacksonville (Florida) Field Office staff spent time searching for Bartram's ixia (*Spenostigma coelestinum*) last spring. This plant, a Category 2 candidate for listing, is a member of the iris family (Iridaceae) with large flowers that open at dawn and close by noon. Endemic to northeastern Florida southwest of Jacksonville, the plant is restricted to the moist, grass understory of pine flatwoods that experience low intensity ground fires every few years.

Bartram's ixia was found at a dozen localities in five of the seven counties where it historically occurred. At most localities, it occurred only as scattered plants at the edges of road rights-of-way or in small remnants of pine flatwoods that have not been converted to pine plantations. The largest populations were on an exceptionally wide road right-of-way with a large flora of wildflowers, on road edges and vacant lots in a large rural subdivision in Middleburg, and in a remnant tract of flatwoods near Middleburg that has been preserved until now because it is used as a cattle range rather than for pulpwood production. The development of pine plantations and the cessation of regular burning of the pine woods appear to have extirpated the ixia from much of its former habitat.

Region 6 — On June 30, 1987, Service personnel met with representatives of the U.S. Air Force and The Nature Conservancy at Warren Air Force Base, Cheyenne, Wyoming, to discuss the status of the Colorado butterfly plant (*Gaura neomexicana* ssp. *coloradensis*) as a listing candidate. The group visited several

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Gaura populations, reviewed the existing Memorandum of Understanding and Management Plan, and discussed future management options.

* * *

The eskimo curlew (*Numenius borealis*) has been thought by some people to be extinct or nearly so. A flurry of observations in coastal Texas in the early 1960's raised speculation that the bird still survived at that time. But few observations were made in the following years, and hopes again diminished. In the 1980's, however, there have been several observations of this species on migration in the central and southern United States and in several areas of Canada. One bird was reported on the Platte River in Nebraska in mid-April 1987. At least two more were reported along the Texas coast in late April and early May 1987. Finally, in late May, Canadian Wildlife Service biologists found a pair in the Canadian Arctic. Preliminary reports indicated that a nest may have been located.

In response to the increased number of observations of eskimo curlews, a group of shorebird specialists from the United States and Canada at the recent American Ornithologists' Union meeting in San Francisco met to discuss ideas for recovering the species from the brink of extinction. Among the ideas mentioned were increasing public awareness that the species is not extinct; characterizing migration, winter, and nesting habitat; and protecting and managing known migration stopover areas.

* * *

The Salt Lake City (Utah) Fish and Wildlife Enhancement Office has again been involved in a cooperative effort to protect American peregrine falcon (*Falco peregrinus anatum*) fledglings from the hazards of learning to fly in a big city. As reported in BULLETIN Vol. XII No. 5-6, a pair of peregrines nested on a ledge at the Hotel Utah again this year. Two eggs hatched. As the fledglings began to try their wings, they had to be rescued from the top of the Marriot Hotel, from a maple tree, and from a canopy over a downtown shop. One bird even spent the night in the garage of a wildlife agent from the Utah Division of Wildlife Resources after it was located on the ground behind the hotel at midnight.

Ten 5-week-old peregrine falcons that hatched in captivity at the Peregrine Fund's World Center for Birds of Prey in Boise, Idaho, were placed in nest boxes in the Great Salt Lake area recently as part of Utah's effort to reintroduce the species. Utah now has five active nesting pairs in the northern half of the state, including the pair mentioned in the paragraph above. The southern half of the State, with its many cliffs and canyons, has more than 40 nesting pairs.

* * *

On June 29, 1987, during a survey at Fort Peck Lake, Montana, for piping plovers (*Chadrius melodus*), two least terns (*Sterna antillarum*) were located on a small island. Although no nest was located, the terns appeared to be exhibiting nesting behavior. Further surveys of the island did not result in other least tern sightings; however, a nesting pair with a nest containing one egg was later observed on a nearby island. This is the first known occurrence of nesting least terns in Montana. To avoid nest disturbance, the site was not revisited for about 3 weeks, at which time the least terns were again sighted, but neither nest nor least tern young were observed.

* * *

The Wyoming Game and Fish Department continues to report that black-footed ferrets (*Mustela nigripes*) born in the captive breeding program are doing well. Six kits (four females and two males) born on June 6 are about one-half grown and now look much like their parents. They are active, move about freely in their cage, and are feeding independently. Another litter of two kits born on June 30 did not fare quite as well. One died, and the surviving female was weak and listless for a time but is now growing and appears to be getting stronger. This kit is being well cared for by its mother and should become more active and independent soon. Concern for the well-being of the young ferrets continues at the Sybille Wildlife Research Unit, but their growth and activity are very encouraging.

Region 8 (Research)— Several Cooperative Research Units are involved in studies concerning the piping plover, which was listed in 1985. The South Dakota Cooperative Fish and Wildlife Research Unit is in the second summer of field work to determine nesting locations and population status of piping plovers along the Missouri River and its tributaries in South Dakota. Although nesting dates varied, nest sites were the same for both years.

The Missouri Unit is engaged in studies in North Dakota to assess population dynamics of breeding piping plovers. Variability of recruitment rates and causes of the variability (e.g., predators) will be examined.

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photo by Don Bleitz

eskimo curlew

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Meanwhile, major North American wintering sites of piping plovers are being located. Other objectives of this study are to determine physical attributes of habitats used by wintering piping plovers and to assess what factors (e.g., human disturbance) may be affecting wintering habitat. Surveys of piping plover habitat have been completed for the southern Atlantic coast; the Gulf Coast through Mexico to the Yucatan Peninsula will be surveyed next winter.

* * *

Biologists on Patuxent's Kirtland's warbler (*Dendroica kirtlandii*) research project participated for 3 days during the week of June 8 in the 1987 Kirtland's warbler singing male census in Michigan. The census accounted for 167 singing males, a 20 percent decline from the 210 males counted last year.

* * *

Fifteen bald eaglets were produced at the Patuxent Wildlife Research Center in 1987. The birds have been released into five States (Georgia, Missouri, New Jersey, Pennsylvania, and Tennessee).

BOX SCORE OF LISTINGS/RECOVERY PLANS

Category	ENDANGERED U.S. Only	ENDANGERED U.S. & Foreign	ENDANGERED Foreign Only	THREATENED U.S. Only	THREATENED U.S. & Foreign	THREATENED Foreign Only	SPECIES* TOTAL	SPECIES HAVING PLANS
Mammals	27	20	242	5	0	22	316	23
Birds	60	16	141	6	2	0	225	55
Reptiles	8	6	60	11	4	13	102	21
Amphibians	5	0	8	3	0	0	16	6
Fishes	39	4	11	24	6	0	84	47
Snails	3	0	1	5	0	0	9	7
Clams	28	0	2	0	0	0	30	21
Crustaceans	5	0	0	1	0	0	6	1
Insects	8	0	0	5	0	0	13	12
Plants	128	6	1	28	3	2	166	58
TOTAL	309	52	466	88	15	37	967	251**

*Separate populations of a species, listed both as Endangered and Threatened, are tallied twice. Species which are thus accounted for are the gray wolf, bald eagle, green sea turtle, Olive ridley sea turtle, leopard, and piping plover.

**More than one species may be covered by some plans, and a few species have more than one plan covering different parts of their ranges.

Number of Recovery Plans approved: 217
Number of species currently proposed for listing: 19 animals
32 plants

Number of Species with Critical Habitats determined: 97
Number of Cooperative Agreements signed with States: 47 fish & wildlife
27 plants

July 31, 1987

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ENDANGERED SPECIES

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